◆ **BLACK BOX**®
NETWORK SERVICES

10/100 Autosensing
Media Converter
Installation Guide

LMC7001A-R4 – LMC7002A-R4 – LMC7003A-R4 – LMC7004A-R4 – LMC7005A – LMC7006A

10/100 Autosensing Media Converter™ is a low-cost, standalone, IEEE 802.3 single-conversion media converter which converts between:

- 10Base-T twisted pair and 10Base-FL single or multi-mode fiber;
- 100Base-TX twisted pair and 100Base-SX multi-mode fiber
- 100Base-TX twisted pair and 100Base-FX single-mode fiber

10/100 Autosensing Media Converter is a 1U high, table-top unit that includes diagnostic LEDs, an internal, universal (100/240 VAC) power supply, one RJ-45 connector for the twisted pair port and one pair of ST (LMC7001A-R4 for 850 nm multi-mode, LMC7005A for 1300 nm multi-mode, and LMC7003A-R4 for 1310 nm single mode) or SC (LMC7002A-R4 for 850 nm multi-mode, LMC7006A for 1300 nm multi-mode, and LMC7004A-R4 for 1310 nm single-mode) connectors for the fiber port.

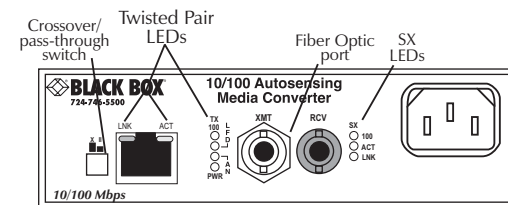## Installing *10/100 Autosensing Media Converter*

10/100 Autosensing Media Converter comes ready to install. The only adjustments that may need to be made after installation are:

- Configuring the unit for its mode of operation and other features.
- Setting the twisted pair port for a crossover workstation or pass-through connection.

To install the *10/100 Autosensing Media Converter*, first make sure that the unit is placed on a suitable flat surface, leaving some space behind the unit. Attach the cables between the *10/100 Autosensing Media Converter* and each device that will be interconnected, then plug the unit into a reliable, filtered power source.
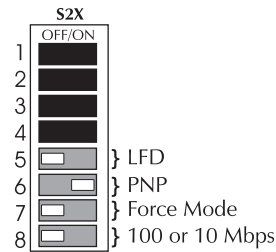
> **NOTE:** *All network cables must be connected for link LEDs to glow.*

The following diagram shows the faceplate on the *10/100 Autosensing Media Converter*. Regardless of the type of fiber connectors, the LEDs operate the same. Refer to page 5 for LED functionality.

Configuration Instructions

10/100 Autosensing Media Converters features an 8-position DIP switch for configuring the unit. This switch is accessed through a cut-out in the bottom of the unit. After configuring the switch, power down the unit and then power up again for the DIP switch changes to take effect. The following table provides simplified definitions of the function of each switch. More detailed information follows.

```
          S2X
        OFF/ON
   1  ████████
   2  ████████
   3  ████████
   4  ████████
   5  [ ▢  ]  } LFD
   6  [  ▢ ]  } PNP
   7  [ ▢  ]  } Force Mode
   8  [ ▢  ]  } 100 or 10 Mbps
```

MODE	SWITCH	FUNCTION	DEFAULT
LFD	S5	*Link Fault Detection (Refer to page 3 for configuration instructions.* Available only in *Force* modes)	OFF
PNP	S6	*Auto-Negotiation Mode (Plug-N-Play)* (Valid only when *Force* mode is disabled)	ON
Force	S7	*Force Mode* — Forces *Autosensing 10/100* to operate at 10 or 100 Mbps as determined by S8	OFF
100 or 10	S8	When **ON**, *Autosensing 10/100* operates at 10 Mbps When **OFF**, *Autosensing 10/100* operates at 100 Mbps	OFF
Note: S1 - S4 are factory configured — **DO NOT CHANGE**			

10/100 Autosensing Media Converter Modes of Operation

The *10/100 Autosensing Media Converter* features three "modes" of operation: **Auto-Negotiation/PNP mode**, **Force 10 mode** and **Force 100 mode**. Your media converter should be configured for one of these modes (factory default is *AN/PNP* mode). For information on *Link Fault Detection,* refer to pages 3-5.

NOTE
10/100 Autosensing Media Converter cannot be manually set for Half- or Full-Duplex. Duplex is determined by the devices to which your media converter is connected.

- **Auto-Negotiation mode**, also known as **PNP**, is the mode most ideally suited for the *10/100 Autosensing Media Converter*. In this mode, the converter will optimally and automatically configure for speed (10 or 100 Mbps) depending on the capabilities of the end stations.

  To enable *Auto-Negotiation*/PNP mode, set switch **S6** to the **ON** position, with switches **S7** and **S8** in the **OFF** position.

- In **Force 10 mode**, the media converter converts 10Base-T to 10Base-FL; 100 Mbps signals are not accepted.

  To enable *Force 10* mode, set switch **S7** and **S8** to the **ON** position, with switch **S6** in the **OFF** position.

4) Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.

5) If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

WARRANTY

Please contact Black Box Corporation for complete warranty information.

SAFETY CERTIFICATIONS

UL/CUL: Listed to Safety of Information Technology Equipment, Including Electrical Business Equipment.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (89/336/EEC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (73/23/EEC). Certified to Safety of Information Technology Equipment, Including Electrical Business Equipment. For further details, contact IMC Networks.

UL LISTED 5M80 ITE E156766 c UL CE	Class 1 Laser product, Luokan 1 Laserlaite, Laser Klasse 1, Appareil A'Laser de Classe 1

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

• If using a high powered device (which is designed for long distance installations) for a short distance installation, the fiber transmitters may overdrive the receivers and cause data loss. If this is the case, you may need to add an optical attenuator to your connection.

Please contact Black Box for more information.

Black Box Customer Service

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support, 24 hours a day, 7 days a week:

Call: 724-746-5500 **Fax:** 724-746-0746

Mail order: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018

Web site: www.blackbox.cox **E-mail**: info@blackbox.com

SPECIFICATIONS

Environmental

Operating Temperature: 32° - 122° F (0° - 50° C)
Storage Temperature: 20° - 160° F (-20° - 70° C)
Humidity: 5 - 95% (non-condensing)

Power

AC Input Load: 100/240 ±10% VAC
100 ±10% VAC ~ 50-60 Hz, 0.1A
240 ±10% VAC ~ 50-60 Hz, 0.05A

FIBER OPTIC CLEANING GUIDELINES

Fiber optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1) Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.

2) Dust caps are installed by the manufacturer to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Assure that the fiber is properly terminated, polished and free of any dust or dirt and that the location is as free from dust and dirt as possible.

⚠ **WARNING!** Integrated circuits and fiber optic components are extremely susceptible to electro-static discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

3) Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.

• In **Force 100 mode**, the media converter converts 100Base-TX to 100Base-SX multi-mode or 100Base-FX single-mode fiber; 10 Mbps signals are not accepted.

There is no auto-negotiation in Force-100 mode.

To enable *Force-100* mode, set switch **S7** to the **ON** position, with switches **S6** and **S8** in the **OFF** position.

AUTO-NEGOTIATION ON YOUR MEDIA CONVERTER

When connecting two *10/100 Autosensing Media Converters* between two end stations (devices such as switches, hubs and repeaters), all devices in the media conversion should ideally support, and be utilizing, *Auto-Negotiation* functionality. While it is possible to have auto-negotiating devices on one side of the media conversion and fixed (non-auto-negotiating) devices on the other, link LEDs will react differently depending on where a link fault occurs. Therefore, Black Box recommends:

A) Configuring every device in the media conversion for *Auto-Negotiation*.

For installations where *Auto-Negotiation* is NOT possible from one end of the media conversion to the other:

B) Manually configure all devices for 10 Mbps or 100 Mbps connections.

TROUBLESHOOTING FEATURES

10/100 Autosensing Media Converter include two advanced troubleshooting features, *Transparency* and *Link Fault Detection (LFD),* to help you locate "silent failures" on your network.

TRANSPARENCY FEATURE

Transparency is only available when using *Auto-Negotiation* mode; it is not available in either of the two **Force** modes. When the *10/100 Autosensing Media Converter* is auto-negotiating, *Transparency* treats the connection between the two end devices as if there were no media converters installed. For example, in a typical application where two media converters are installed between two copper-based switches, the twisted pair cables as well as the fiber cable are seen as "one" entity. Therefore, if a fault occurs on any segment between the two end devices, link LEDs on the end devices will go out.

As stated, *Transparency* is available when the *10/100 Autosensing Media Converter* is operating in *Auto-Negotiation* mode, therefore **S6** (AN/PNP) must be **ON** and **S5** (LFD), **S7** (Force) and **S8** (10/100) must be **OFF**.

LINK FAULT DETECTION FEATURE

Link Fault Detection is only available when using *Force-10* or *Force-100* mode; it is not available in *Auto-Negotiation* mode. When LFD is enabled and the input link is down at one interface to the *10/100 Autosensing Media Converter*, the transmitter output on that interface is turned off for about 425ms every 3.8 seconds (i.e. blinking). It applies to both network interfaces and to both data rates. If the link at the other interface to the *10/100 Autosensing Media Converter* is also down, there is no output. LFD causes the Link Up indicator of the link partner to blink.

When the *10/100 Autosensing Media Converter* is in one of the *Force* modes, enable LFD by setting **S5** to the **ON** position. Disable LFD (default) by setting **S5** to the **OFF** position. In order for LFD to function properly, Force mode must be enabled by setting **S7** to **ON** with either **S8** **ON** for 10 Mbps or **S8 OFF** for 100 Mbps. NOTE: **S6** must also be ON when enabling LFD.

NOTE
When using the LFD feature, if the DIP switches are in any other combination than listed above, your 10/100 media converter may exhibit erratic behavior.

TWISTED PAIR CROSSOVER/PASS-THROUGH SWITCH

The *10/100 Autosensing Media Converter* features a crossover/pass-through push-button switch, located on the faceplate next to the RJ-45 connector, to set the twisted pair connection type (see page 1 for illustration of location).

Select a pass-through connection by pressing the push-button IN. A crossover connection is selected when the push-button is OUT. If you are not sure which connection is needed, set the push-button to whatever setting makes the twisted pair LNK (link) LED glow.

LED Indicators

The *10/100 Autosensing Media Converter* features several diagnostic LEDs per port. The LED functions for the media converter are:

TWISTED PAIR PORT

LNK   Glows green when a twisted pair *link* is established.

ACT   Glows yellow when data is detected on the port.

100   Glows yellow when *100 Mbps* data is detected on the port.

LFD   Glows green when *Link Fault Detection* is enabled.
(**NOTE**: *This feature is only available when either Force -10 or Force-100 mode is enabled. Refer to the LFD LED Activity section for more information.*)

AN   Glows green when *Auto-Negotiation/PNP* mode is enabled.

PWR   Glows green when unit has *power*.

FIBER PORT

100   Glows yellow when *100 Mbps* data is detected on the port.

ACT   Glows green when data is detected on the port.

LNK   Glows green when a fiber *link* is established.

NOTE
Twisted pair AND fiber optic cables must be connected, and the twisted pair crossover/pass-through switch set correctly, before either LNK LED will glow solid.

LINK FAULT DETECTION LED ACTIVITY

When LFD is enabled and a fault occurs on a segment of the media conversion, the various Link LEDs in that conversion will either blink or extinguish. LEDs may react differently depending on the type of end devices in the conversion, whether the *10/100 Autosensing Media Converter* is in *Force-10* or *Force-100* mode, where the fault occurs, etc. For questions, please contact Technical support.

Installation Troubleshooting

- During installation, first test the fiber and twisted pair connections with all troubleshooting features disabled, then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.
- When working with units where the features cannot be disabled, you must establish BOTH your twisted pair and fiber connections before the link LEDs will light!
- To test a media converter by itself, first make sure you have an appropriate fiber patch cable, then follow these steps to test:

    Step 1: Connect the media converter to the twisted pair device with a twisted pair cable.

    Step 2: Loop a single strand of fiber from the transmit port to the receive port of your media converter.

    Step 3: Verify that you have both twisted pair and fiber link (see LED Operation section, page 4)) on your media converter.

    NOTE: Use caution when conducting a loopback test; it is possible to create a network loop if connecting the media converter's twsited pair port to an active network. IMC Networks recommends connecting the twisted pair cable to a PC when performing this type of test.

- Make sure to use the appropriate twisted pair cable, and have the crossover/pass-through switch set correctly if your media converters do not include *AutoCross*.